Lecture questions

In this exercise you will answer questions related to this week's lecture.

Note that you can submit the answer to each question only once. The questions are designed to be easy if you have followed the lecture. Note that the questions can vary slightly between students.

Points 10 / 10 My submissions 1 / 1 Deadline Friday, 12 May 2023, 19:00 To be submitted alone

You have used the allowed amount of submissions for this assignment.

Opinion dynamics model

Question 1 10 / 10

Which of the following best describes the "model for opinion dynamics" discussed in the lecture:

- (●) **The active agent wants to change its opinion, and does it with certainty if there are more agents of the different opinion than the same opinion in its neighbourhood. If there are more agents with the same opinion, it changes the opinion with probability that is smaller the more agents of the same opinion there are.**
- ( ) The active agent adopts a randomly chosen trait from a randomly chosen neighbour, but only if the similarity of all the traits between that neighbour and the active agent is below a threshold.
- ( ) This model is a combination of the opinion chance mechanism described in the first option (the opinion part of the model) and the dynamics of the Schelling model where the agents move in the grid (the dynamics part of the model).

✔ Correct!

Submit

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Opinion dynamic model, results

Question 1 10 / 10

Which of the following best describes the results of the "model for opinion dynamics" discussed in the lecture:

- ( ) There are two main outcomes: For small values of p (smaller than around 0.6) "ordered" outcome where most opinions are the same (either blue or red). For large values of p (larger than around 0.75) there is an "disordered" outcome where there are roughly equal amount of blue and red opinions and no large regions of single opinion.
- ( ) When adding the external influence mechanism the system will exhibit memory of the external influence in the "ordered" regime of the parameter p: For example, when the external influence favouring the red color is large enough, the outcome will always be mainly red society. This state will remain even after the external influence is removed.
- (●) **Both of the above are correct.**

✔ Correct!

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Ising model and opinion dynamics

Question 1 10 / 10

Consider the correspondence between the Ising model and the opinion dynamics model discussed in the lecture. In this context, what do spins (up and down) in the Ising model represent within the opinion dynamics model?:

- (●) **Opinions (blue and red)**
- ( ) Agents and empty spaces
- ( ) Temperature and external field

✔ Correct!

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ABMs in CSS and statistical physics

Question 1 10 / 10

Which of the following descriptions of concepts in statistical physics, which can also be applied to social agent-based models (ABMs), is *incorrect*?

- ( ) Finite size scaling is a technique used to analyze the behavior of systems with a limited size. It helps to extrapolate the properties of an infinite system by studying the effects of system size on various quantities.
- ( ) Universality refers to the observation that certain properties of systems undergoing phase transitions are independent of the specific details of the system, such as the details of the lattice structure.
- ( ) Hysteresis is a phenomenon in which the current state of a system depends not only on its current input but also on its history.
- (●) **Phase transition is a concept specific to the Ising model and is not useful in other contexts. It describes how a single spin changes "phase" from up arrow to down arrow.**

✔ Correct!

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You have used the allowed amount of submissions for this assignment.

Feedback loops

Question 1 0 / 10

Which of the following statements on how "feedback loops" play a crucial role in the development of emergent behavior, phase transitions, and order-disorder transitions is the most *incorrect*.

- (●) **In the Schelling model, the feedback loop can be described as follows: The more homogenous the neighbourhoods get, the more the different households want to move out, and the similar households want to stay where they are. This again creates more homogenous neighbourhoods.**
- ( ) Feedback loops are irrelevant in the development of emergent behavior, phase transitions, and order-disorder transitions, as they have no influence on the interactions between system components.
- ( ) In the opinion model described in the lecture, the feedback loop can be described as follows: The more agents there are of the same opinion (e.g., more red opinion there is), the more likely it is that agents with the other opinion (e.g., the blue opinion) change their opinion. This again leads to more of the same opinion (e.g., the red opinion).

✖ Incorrect

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Connection between statistical physics and computational social science

Question 1 10 / 10

Which of these options *worst* describes the connection between computational social science (and agent-based models in it) and statistical physics?

- ( ) Both fields focus on understanding the emergence of complex phenomena from the interactions of simpler components, such as particles in statistical physics or individuals in a social system.
- ( ) Agent-based models are similar to lattice models or spin systems in statistical physics, where the system is represented by a discrete set of elements that interact with one another according to specific rules.
- ( ) In both fields, researchers can be interested in uncovering general principles that govern the behavior of various systems, regardless of the specific details of the interactions between their components. This is evident for example in the concept of universality in phase transitions in both statistical physics and computational social science.
- (●) **The connection between computational social science, particularly agent-based models, and statistical physics is that they both heavily rely on the use of interpretative dance to represent and analyze complex systems. The choreography of each dance captures the intricate interactions between particles or social agents, enabling researchers to visualize and study emergent phenomena in a unique and artistic way.**

✔ Correct!

Submit